

[8pts]

Attached is housing.txt data set that was used in the regression program. This data set is in fact a classification data set with the last column classifying the houses by proximity to the sea/bay.

This classification is your purpose in this program. You need to

1. Input the file; separate features and the classifying (last) column which contains the labels
2. Convert labels into integers (I believe there are 4 labels) and then to categorical suitable for softmax classification.
3. Divide data into training set, validation set and testing set
4. Convert features into float 32 type
5. Assemble ANN of dense layers. You have considerable freedom what to do here to achieve best results:
 - a. you can do shallow network (1 hidden layer) or deep network (with more than 1 hidden layer – I recommend not more than 5 layers).
 - b. You can have any dimension of each layer (but I recommend no less than 16 and no more than 64).
 - c. Classification layer should be softmax
 - d. Keep in mind that deeper network gives more training accuracy but also
 - i. requires more training time and training parameters
 - ii. is prone to overfitting because of excess number of parameters (so may give worse validation accuracy).
6. Compile the network with standard cross entropy loss using RMSprop method for stochastic batch gradient tracking accuracy
7. Fit the network. You need to choose batch size and number of epochs
 - a. I recommend batch sizes between 128 and 1024, but it is your choice.
 - b. Don't overdo with the number of epochs – see where loss bend on validation happens and stop there.
8. Plot loss and accuracy

All necessary patterns/information on programming is contained in week 3 folder regression jupyter nb, week 4 folder imdb review classification jupyter nb and in week 5 mnist jupyter nb (digits recognition by FFNN) program.

Partial credit:

- Part 1-4 [2pts]
- Part 5-6[2pts]
- Part 7 [3pts]
- Part 8 [1pt]